

Application No.: 10/537,947

Docket No.: 10404,024.00 US

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-28. (canceled)

29. (Previously Presented) A process for the preparation of an insertion compound of an alkali metal comprising following steps:

a) an organic complex of a transition metal or of a mixture of transition metals M in an oxidation state of greater than 2 is brought into contact with Li_2HPO_4 and with an entity of formula $\text{H}_b(\text{XO}_4)$, where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and b has a value from 0 to 5, in a liquid medium in a closed chamber; the chamber is brought to a temperature T which makes possible the decomposition of the organic complex in said liquid medium; and

b) the temperature and the pressure in the chamber are brought back to ambient temperature and atmospheric pressure and the insertion compound of an alkali metal of formula LiMXO_4 , in which M is in the +2 oxidation state, is recovered.

30. (Previously Presented) The process according to claim 29, in which the metal M in the organic complex is in an oxidation state of 3 to 5.

31-33. (Canceled)

34. (Previously Presented) The process according to claim 29, in which X is P.

35. (Canceled).

36. (Previously Presented) The process according to claim 29, in which the organic complex comprises the metal M bonded to an organic ligand chosen from compounds of the formula:



in which at least one selected from the group consisting of R_1 , R_2 and R_3 comprises at least one oxygen atom.

37. (Previously Presented) The process according to claim 36, in which, in the organic ligand, R_1 , R_2 and R_3 are chosen independently from carboxy (1-4C) alkyl radicals.

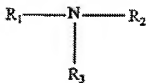
38. (Previously Presented) The process according to claim 37, in which the organic ligand is nitrilotriacetic acid $N(CH_2CO_2H)_3$ or ethylenedioxyethylenedinitriletetraacetic acid (EGTA).

39. (Previously Presented) The process according to claim 29, in which the liquid medium in step a) is selected from the group consisting of water, organic solvents, and mixtures thereof.

40. (Previously Presented) The process according to claim 29, in which, on conclusion of step b), the compound is washed and then dried, optionally under vacuum.

41. (Previously Presented) The process according to claim 29, in which the organic complex is prepared in a step prior to step a) by bringing a salt of the metal M in the oxidation state greater than 2 into contact with an organic compound in the liquid medium of step a).

42. (Previously Presented) The process according to claim 41, in which the organic compound is chosen from compounds of the formula:



in which at least one selected from the group consisting of R_1 , R_2 and R_3 comprises at least one oxygen atom.

43. (Previously Presented) The process according to claim 42, in which, in the organic compound, R_1 , R_2 and R_3 are chosen independently from carboxy (1-4C) alkyl radicals.

44. (Previously Presented) The process according to claim 43, in which the organic compound is nitrilotriacetic acid $N(CH_2CO_2H)_3$ or ethylenedioxyethylenedinitriletetraacetic acid.

45. (Previously Presented) The process according to claim 41, in which the salt of the metal M is chosen from the group consisting of nitrates, sulphates, chlorides, acetates, citrates and carboxylates of the metal M.

46. (Previously Presented) The process according to claim 41, in which the liquid medium is selected from the group consisting of water, organic solvents, and mixtures thereof.

47. (Previously Presented) An insertion compound of an alkali metal of formula $LiM(XO_4)$ where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and M is a transition metal in a +2 oxidation state, characterized in that the insertion compound exhibits a content of the metal M in an oxidation state of greater than 2 of less than 5% by weight,

wherein the insertion compound is present in the form of particles or grains, the particles exhibit a fully controlled homogeneous morphology, and a deviation from the mean value of the size of the particles is less than 20%.

48. (Canceled)

49. (Previously Presented) The compound according to claim 47, in which the particles have the shape of cylinders, cubes or polyhedra.

50-51. (Canceled)

52. (Previously Presented) An electrode active material comprising one or more compounds according to claim 47, optionally in combination with one or more other active compounds, selected from the group consisting of LiCoO_2 , LiNiO_2 , manganese oxides, $\text{Li}_{1+x}\text{Mn}_{2-x}\text{O}_4$ (with $0 \leq x \leq 0.33$), compounds of a family isotypic with olivine, compounds with a Nasicon structure, and insertion materials of lithium of an orthosilicate type.

53. (Previously Presented) A positive electrode comprising the active material according to claim 52.

54. (Previously Presented) A battery comprising the electrode according to claim 53.

55. (Previously Presented) The battery according to claim 54, comprising a negative electrode based on $\text{Li}_4\text{Ti}_5\text{O}_{12}$.

56. (Previously Presented) An electrochromic device comprising the compound according to claim 47.

57. (Previously Presented) The process according to claim 30, in which the metal M in the organic complex is in an oxidation state of 3.

58. (Previously Presented) The process according to claim 29, in which the metal M is Mn, Fe, Ni, Co, or a mixture thereof.

59. (Previously Presented) The process according to claim 37, in which, the carboxy (1-4C) alkyl radicals are carboxymethyl or carboxyethyl.

60. (Previously Presented) The process according to claim 39, in which the organic solvents are liquid alkanes.

61. (Previously Presented) The process according to claim 60, in which the liquid alkanes are dodecane or tributyl phosphate (TBP).

62. (Previously Presented) The process according to claim 43, in which the carboxy (1-4C) alkyl radicals are carboxymethyl or carboxyethyl.

63. (Previously Presented) The process according to claim 46, in which the organic solvents are liquid alkanes.

64. (Previously Presented) The process according to claim 63, in which the liquid alkanes are dodecane or tributyl phosphate (TBP).

65. (Previously Presented) The compound according to claims 47, in which the deviation from the mean value of the size of the particles is less than 10%.

66. (Previously Presented) The compound according to claims 65, in which the deviation from the mean value of the size of the particles is less than 1%.

67. (Previously Presented) The electrode active material according to claim 52, in which the compounds of the family isotypic with olivine are LiFePO_4 .

68. (Previously Presented) The electrode active material according to claim 52, in which $\text{Li}_{1+x}\text{Mn}_{2-x}\text{O}_4$ (with $0 \leq x \leq 0.33$) is LiMn_2O_4 .

69-75. (Canceled)

76. (Previously Presented) The insertion compound according to claim 47, wherein the insertion compound exhibits a content of the metal M in the oxidation state of greater than 2 of less than 1% by weight.